CHAPTER 7. PHILOLOGICAL SCIENCES

GEMINATES AND AMBISYLLABIC CONSONANTS IN UKRAINIAN AND GERMAN

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Abstract. The present monograph is devoted to the comparative and experimental phonetic research of geminates and ambisyllabic consonants in Ukrainian and German languages. In the paper it was defined that:

1. The doubled geminate is found at the junction of words and at the junction of morphemes. It is characterized by a falling-rising articular tension and represents bi-phonemes. (For example, Ukr. бе**з з**ими, Ger. vo**n n**euem, Ukr. ро**зз**броїти, осі**нн**і, Germ. u**mm**achen, au**ff**ordern).

2. The elongated geminate occurs before a stressed vowel in one morpheme and in one syllable. It is characterized by rising articular tension and represents a mono-phoneme. (For example, Ukr. жи-**тт**я, зна-**нн**я, су-**дд**я).

3. Ambisyllabic consonant encounters in the same morpheme, at the junction of two syllables, after the stressed vowel. It is characterized by a falling-rising articular tension and represent bi-phoneme. (For example, Ukr. наслі**нн**я, воло**сс**я, Germ. Si**pp**e, ko**mm**en).

The results of experimental phonetic studies have shown that in Ukrainian language the geminate consonants function as mono-phonemes and bi-phonemes and in German – as bi-phonemes.

This experimental phonetic research of geminates and ambisyllabic consonants has prospects of being continued in the future on the basis of other languages.

1. Introduction

The monograph has been devoted to the comparative experimental and phonetic research of geminates and ambisyllabic consonants in Ukrainian and German on the solution of the issue of their fonematic status.

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The study of phenomenon of consonant gemination in the world's languages is one of the complicated issues of phonetic and experimental research.

Under the term 'gemination' (duplication, reduplication), shall be understood the double increase of sound length, for example: Ukr. *оббити, довкілля;* Germ. *auffordern, Spinne*. The fonematic status of geminates and ambisyllabic consonants is still the subject of discussion among linguists for centuries (L. V. Shcherba [7], F. de Saussure [6], N. S. Trubetskoi [9], E. Haugen [2], M. A. Zhovtobriukh [36], Yu. O. Karpenko [21], I. I. Kovalyk [22], P. P. Kostruba [23], H. M. Mizhevska [26], A. A. Moskalenko [25], M. F. Nakonechnyi [24], V. S. Perebyinis [27], M. Ya. Plushch [28], L. I. Prokopova [29], O. N. Syniavskyi [33], I. P. Suntsova [32], H. F. Shylo [34], P. Eisenberg [11], T. Becker [10], Otto von Essen [13], F. Simmler [15], R. Szczepaniak [18], H. U. Schmid [16], G. Schunk [17]).

The geminated sounds (both vowels and consonants) represent one of the important problems from the phonological point of view. The controversial point is the definition of their monophonemic and binophonemic status. The point at issue is whether the geminated consonants are one phonetically long phoneme or the combination of separate phonemes.

For the solution of this issue, one can use many different methods, criteria and rules directed to the unambiguous definition of fonematic status of geminated consonants. The problem of definition of monophonemic or binophonemic status of geminated consonants is closely connected with the more general problem of speech flow division into minimal parts. The segmentation of speech flow and accordingly the phonological interpretation of geminated sounds are in the direct dependence on phonological system of each certain language.

In the monograph, the phenomenon of phonematicity and biphonematicity of geminated consonants has been described from a new perspective, and namely: the monophonematicity and biphonematicity of geminated consonants depends on the stress. Both phoneme and word stress execute the constitutive function (word-recognition) – they take part in the formation of the word exterior form, while bringing the adjoining unstressed syllables under control, due to this:

• the geminated consonants are realized after stressed vowel as bi-phonemes that are separated between syllables,

• the geminated consonants are realized before stressed vowels as mono-phonemes that begin the stressed syllable.

The purpose of the work is the presentation of definitions and concepts of geminated consonants and their identification. It has been shown in contrastive and experimental way that the stress plays an important role in the determination of fonematic status of geminated consonants.

The doubled and elongated consonants are assigned to geminated consonants in the work.

The monograph, as the experimental and phonetic research, has been composed as an example for the further contrastive researches.

2. Historical conditions of formation of geminated consonants in Ukrainian and German

The geminated consonants have been formed in Ukrainian and German not only because of conjunction of two identical consonants at the junction of morphemes or words, for example: Ukr. *оббити, віддати,* Germ., *auffallen, mitteilen*, but also because of historical palatalization of [j], that has led to the special change of adaptation of [j] to the previous consonant, for example: Ukr. *[mʹj]→[mʹ:] – [cmamʹja] → [cmamʹ:a] → cma**мм**я*, Germ. *[pj]→[p:] – [sipja] → [sip:a] → Si**pp**e*. That is to say, that the full progressive assimilation of letter J to the previous consonant has occurred. Therefore, it was the process of bilateral adaptation within the root syllable. Two identical consonants occurred at the junction of type ‘consonant + j’.

G. J. Shevelov notes that the special change took place, namely the adaptation of **j** to the previous consonant (*груддя*, until the middle of XVI century). The processes of bilateral adaptation have occurred within the root syllable, namely long consonants have occurred at the junction of type ‘C+j’ [30, p. 631].

Also the well-known West Germanic duplication of consonants after the short vowel before the sonorants *j, w, r, l* (seldom – before m, n [15, p. 340], the consonants were doubled (excluding r), however *j* and *w* have disappeared, while getting assimilated [15, pp. 301–310].

R. Szczepaniak points at that ‚the heterosyllabic combinationations are the initiial point of the West Germanic germination, in which the first consonant is stronger than the second one’ [18, p. 118]. The degradation of *j,* seldom of *w l, m, n,* and *r* has occurred and because of this, the structure of the syllable has changed. For example: Got. *bidjan* – Ahd. *bi**tt**en 'bi**tt**en' 'ask'*, Got. *akrs* – Ahd. *acker 'Acker' 'field*', ahd. *Epli,* Germ. *ap.la* > West. Germ. *ap.pla* > ahd. *a**pp**ful 'Apfel' 'apple'*.

The geminated consonants have occurred also because of the progressive assimilation through the soft consonant, after this the weak reduced [ь] of the the next sound [j] has disappeared, for example: Ukr. *житьє-життя*, *тънью- тінню* [39, p. 147]. First of all, the closed consonants and seldom the fricative have undergone the gemination. These processes have been observed in all Germanic languages. For example: *Lubbi* 'hairy dog', *lobbe* 'spider', *budda* 'beetle', *cohettan* 'cough', *snekko* 'snail', *spottōn* 'laugh', *letto* 'clay', *atta* 'father'.

In other words, the graphical duplication is not just an accidental writing, but also a reflection of the opposition of long consonants with short ones.

From the stated above, we determine the congruence of the comparison of the researched languages:

• geminates have occurred historically in both languages, namely as a result of

1) assimilation [j] with the previous consonant *([mʹj]→[mʹ:] – [cmamʹja]→[cmamʹ:a] → cmammя, [pj]→[p:] – [sipja]→[sip:a] → Sippe*) [29, p. 631; 14, p. 99];

2) degradation of the reduced vowels (*виньныи* > *винныи*, *въ* > *в*, *heriro* > *herr, wanne* > *wenn, denne* > *denn*) [30, p. 435; 11, p. 16–17].

That is to say, the graphical duplication is not just an accidental writing, but also a phonetic process that has supported the formation of long consonants in both researched languages.

3. Definition of geminated consonants

The term 'gemination' comes from the Latin 'gemino' – 'to double' and is defined as 'a double increase in the length of sound' [37, p. 483]. The definition of consonant gemination is usual for the most languages of the world. The gemination occurs for a variety of reasons and can execute various functions, for example:

a) form-differentiating, compare: Ukr. суть – суттю, цвіль – цвіллю; Germ. nehmen – nimmt; treten – tritt;

b) word-differentiating, compare: Ukr., скеля – скелля (n., sg. and n., pl.); лють – ллють (n. and v.); вваж – важ (form of v. imper. from v. вважати – важити); ввись – вись (adv. and n.); Ганна (own name) – гана (n.); Чи Таня (part + own name) – читання (n.); у груші – у грушші (n., sg. and n., pl. local case); у суді – у судді (n., sg. vocative case and n.,

sg. vocative case); Germ der Ofen – offen (n. and adj.); sonst – sonnst (conj. and v. 2 nd. pers.); der Boden – der Bodden (n. and n.); das Koma – das Komma (n. and n.); kam – der Kamm (v. past tense and n.); man – der Mann (pron. and n.); du hast – du hasst (haben – hassen) (v. and v.); ich haste – ich hasste (hasten – hassen) (v. present tense and v. past tense); der Wal – der Wall (n. and n.); ist – isst (v. 3rd. pers. sg. from v. sein and v. 2nd or 3rd pers. sg. from v. essen) der Star – starr (n. and adj.); beten – betten – die Betten (v. – v. and n.pl.);

c) assimilative, compare: Ukr. віддати, оббити, роззути, кіннота, дам матері; Germ. annehmen, abbauen, mitteilen, am Mittag.

On the basis of the term 'gemination', the geminated consonants or geminates are defined as:

• consonants which articulation is carried out with a releasing delay (for example, Russ. оттого 'через те', поддал 'піддав'), (the examples of the author: Ukr. віддавати, Germ. auffallen);

• two identical consonants in the syllable of the word for example, Russ. ванна 'bath', French immense 'huge', Ital. femmina 'woman'), (the examples of the author: Ukr. знання, Germ. Bissen) [37, p. 208]. In other words, consonants with a releasing delay during the articulation of sounds or two identical consonants in the syllable of the word have been defined as geminates.

The term 'geminates' is found in Ukrainian works in the same meaning, in which researchers [21; 24; 35; 39] distinguish respectively 'doubled' and 'elongated' consonants. That is, 'the prolonged consonant should be considered as a long consonant not at the junction of morphemes', for example: весілля, життя; the doubled consonant should be considered 'at the junction of clearly marked morphological parts of the word – the prefix or preposition and root ..., or the preposition and the basis of the prefixed word', for example: prefixed word', for example: віддати, від дороги [24, p. 146].

The similar distinction between the two types of geminated consonants in German language has been made by T. Alan Hall, indicating those that are realized in one morpheme as 'real' and at the junction of the morphem as 'unreal' geminates [1, p. 254-255].

According to L. I. Prokopova, the long consonant sounds are characterized by a longer duration of sound than other sounds. Each long consonant acts as a sound implementer of two phonemes [жит′т′а], [т′ін′н′у] [39, p. 147].

That is, the doubled consonants are the conjunction of identical consonants belonging to the important parts of the word, the elongated consonants have been formed not because of the conjunction of two identical consonants, but because of the phonetic process of assimilation [36, p. 152].

According to the studies of Ukrainian linguists, the doubled consonants are perceived as elongated sounds (M. A. Zhovtobriukh [36], Yu. O. Karpenko [21], I. I. Kovalyk [22], P. P. Kostruba [23], H. M. Mizhevska [26], A. A. Moskalenko [25], M. F. Nakonechnyi [24], M. Ya. Plushch [28], L. I. Prokopova [29], I. P. Suntsova [32], H. F. Shylo [34]).

Thus, the long consonants 'geminates' are observed in Ukrainian. They are divided into doubled 'unreal' geminates and elongated 'real' geminates that phonetically represent a long sound.

German researchers who studied the functioning of the geminates P. Eisenberg [12], T. Becker [10], Otto von Essen [13], F. Simmler [15], R. Szczepaniak [18], H. U. Schmid [16], G. Schunk [17]) consider that in modern German the geminated consonants function as 'unreal' doubled geminates at the junction of words and at the junction of morphemes. The ambisyllabic consonants but not 'real' geminates are implemented in one morpheme and are assigned both to the previous and to the following syllables [12, p. 17]. They mark the syllables and, in such way, the doubled writing of consonants has been explained. However, the pronunciation of such ambisyllabic consonants in one morpheme is characterized by one sound. The ambisyllabicity indicates the previous short vowel. In addition, the ambisyllabic consonant is characterized by an implosion position. 'The sound can be ambisyllabic if it is connected with an implosion position' [10, p. 96].

So that, the geminates are observed in German that are divided into 'unreal' 'doubled' and 'real' 'elongated' consonants, replaced by a new term ambisyllabic consonants which phonetically represent a long sound.

4. Identification of geminated consonants

The geminated consonants have occured between the vowels of front and back row. The position of the geminates in relation to the stress: a) after the stressed vowel, b) before the stressed vowel.

The geminated consonants function:

a) at the junction of words in one syntagm, for example: Ukr. *без зими*, Germ. *von neue;*

b) at the junction of morphemes, for example: Ukr. *роззброїти,* Germ. *ummachen;*

c) in one morpheme, in one syllable before the stressed vowel, for example: Ukr. *жи/ття, су-ддя*;

d) in one morpheme, at the junction of two syllables, after the stressed vowel, for example: Ukr. *колос-ся, камін-ня*, Germ. *Sip-pe, kot-ten*.

The identification pronunciation of the geminated consonants has been segmented in the work according to the rule of P. Mermelstein [4]: the division of the speech flow into the syllables occurs in the places where the intensity of the sound wave decreases significantly between the segments which duration is typical for these units (syllables). The core of the syllable is the point of the maximum intensity level within the segments [4, p. 880-883]. Such a division of speech into syllables is traditionally used in phonetic researches (O. S. Ishchenko [20], N. Jong [3], T. Pfau [5], H. Pfitzinger [14]) (this is a software for the analysis of sound vibrations), because it is impossible to hear all the changes of the intensity of the sound wave by the organs of hearing.

The software PRAAT 5.0.43 has provided a graphical picture of a speech signal – a spectrogram, on which was marked the duration (ms), the frequency of the main tone (Hz), intensity (dB), articulatory tension (μPk) of segmented sections.

The frequency of the main tone of the geminated consonants has been represented by two Models:

Model 1 is characterized by a descending and ascending direction of articulatory tension that represents the bi-phonemes.

Model 2 is characterized by the ascending direction of the articulatory tension that represents the mono-phoneme.

The intensity of the geminated consonants at the junction of two words within one syntagm, at the junction of morphemes, at the junction of two syllables and in one morpheme have been observed on spectrograms, which allowed to obtain the following data:

a) the position of the resonant frequencies in the spectrum of consonants,

b) the change in the intensity of the dominant resonant frequency at the boundary between delay time of the geminated consonants,

c) the transition from vowel to consonant and from consonant to vowel.

From the foregoing can be made the rules for determining of the mono- and biphonematicity of geminated consonants with respect to acoustic data:

1. There is an intensity for Model 1 that has an incomplete phase of pronunciation, for example: the first consonant is deprived of the third phase (recursion), and the second consonant is without the first phase (excursion). The second phase (delay time) in both geminated consonants is retained and doubled. Such spectral picture is typical for biphonemic geminated consonants. The acoustic parameters, that determine the biphonemic geminates, are with a difference in intensity between the geminated consonants (see fig. 4.1, fig. 4.2).

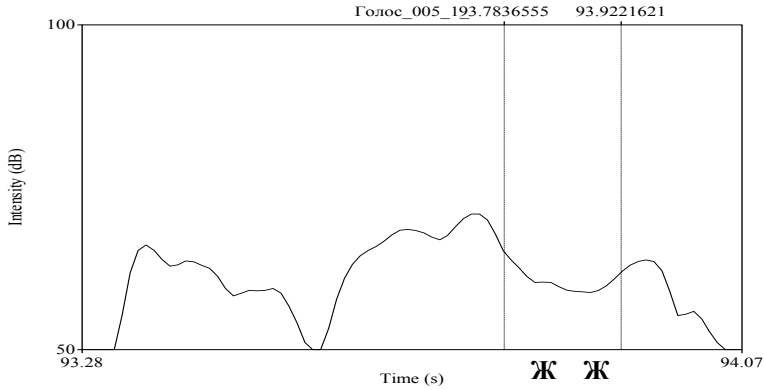


Fig. 4.1. Spectrogram of the word Ukr. ‘безмежжі’

2. The intensity that is typical for Model 2 has three phases of pronunciation: excursion, delay time, recursion. Such spectral picture is typical for monophonemic geminated consonants. The acoustic parameters of the monophonemic geminates consist in the fact that the general motion of intensity is ascending as at the beginning of the word (see fig. 4.2), as well as at the beginning of the syllable, if the geminates are before the stressed vowel (see fig. 4.3)

Thus, as a result of the research of the functioning of geminated consonants, three criteria have been identified:

• The geminated consonants at the junction of words in one syntagm, at the junction of morphemes, have been identified as doubled ‘unreal’ geminates, which are characterized by a descending and ascending direction of articulatory tension, and occur in an intervocal position, for example: Ukr. *ні**д д**убком, о**бб**ити,* Germ. *a**m M**ontag, au**ff**ordern*.

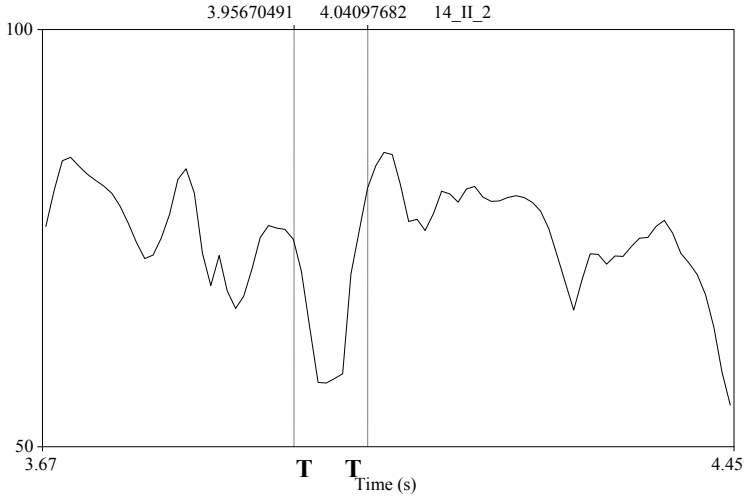


Fig. 4.2. Spectrogram of the word Germ. ‘forttragen’

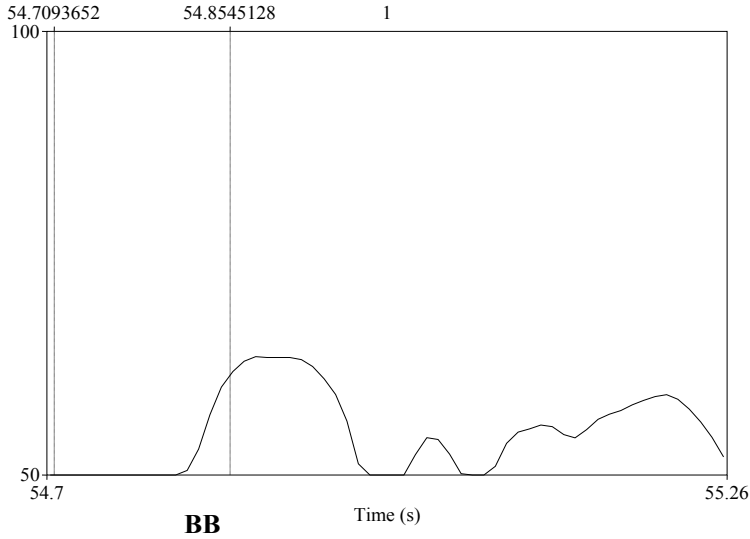


Fig. 4.3. Spectrogram of the word Ukr. ‘вважати’

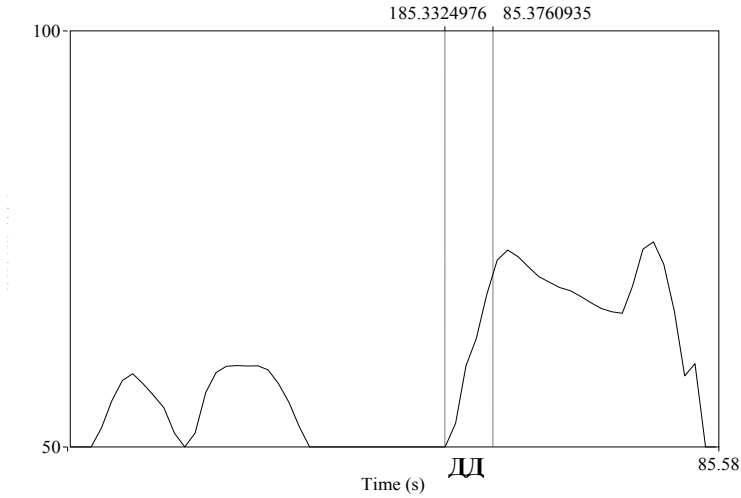


Fig. 4.4. Spectrogram of the word Ukr. 'у судді'

• The geminated consonants in one morpheme, in one syllable before the stressed vowel have been identified as elongated 'real' geminates and are characterized by ascending articulatory tension, for example: Ukr. ***вв**ічливість, ли**тт**я*.

• The geminated consonants after the stressed vowel at the junction of the two syllables have been identified as ambisyllabic consonants and are characterized by descending and ascending articulatory tension, for example: Ukr. *воло**сс**я, весі**лл**я*, Germ. *zi**tt**ern, Pu**pp**e*.

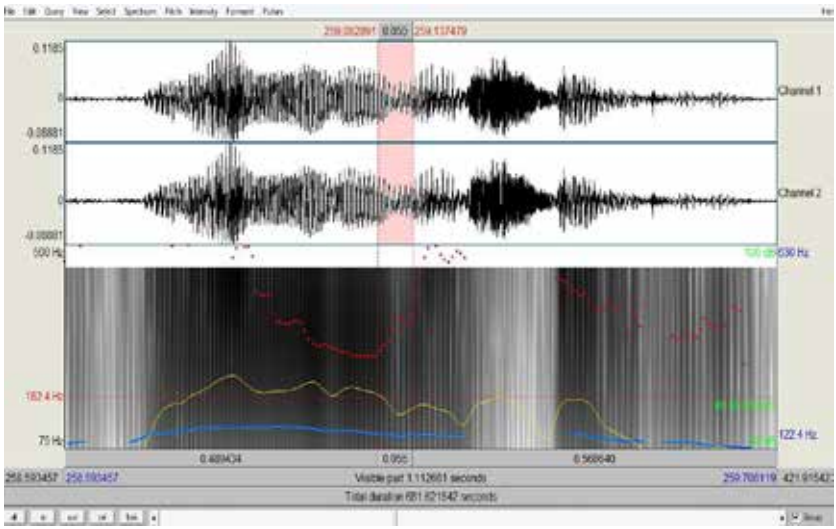
5. Fonematic status of geminates and ambisyllabic consonants in Ukrainian

From the phonemic point of view, the following conclusion can be made:

Model 1 is characterized by the descending and ascending direction of articulatory tension and indicates the conjunction of two identical consonants at the junction of two words, morphemes and syllables representing two phonemes (bi-phonemes).

Model 2 is characterized by the ascending direction of articulatory tension and represents two identical consonants, which represent one long consonant and which is a long phoneme (mono-phoneme).

Geminates as bi-phonemes are found in the Ukrainian:
a) at the junction of two words within one syntagm (see fig. 5.1):



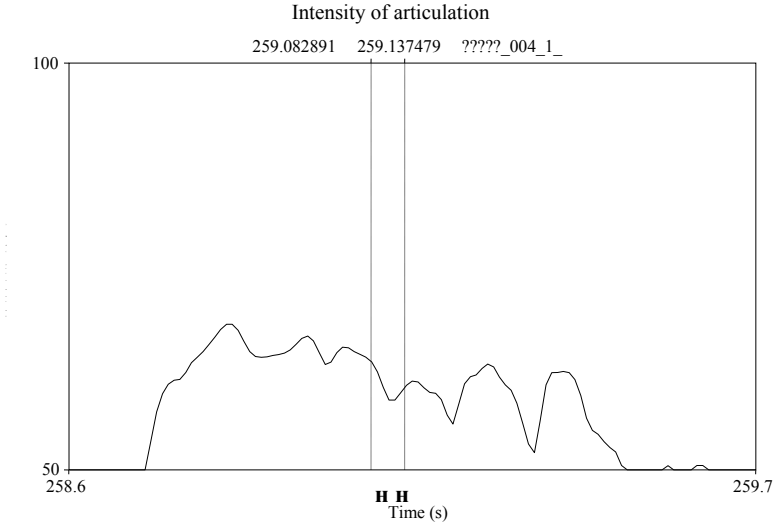


Fig. 5.1. Spectrogram of the word Ukr. ‘гомін на селі’

There is a duplication of sonorants /н - н/ on the spectrogram (see fig. 5.1) '*гомі**н** **н**а'*. The first of sonorant is realized at the end of the word and stands after the vowel, and the second one takes an initial prevocal position in the function word. Each of these sounds has different articulation properties. The pronunciation of final consonant /н-/ in the first word is relatively weakened and has a decreasing tension, the explosion of its closure is not realized, and smoothly converts to /-н/ of the following syllable. The last one is used in the initial position of the word, which position is always stronger in comparison with final position, and phonetically, the sound occupies a place in the ascending movement of the tension of the word. The indicated junction of the sonorants /н–н/ creates the descending and ascending direction of articulatory tension, the minimum value of which is at the junction of two consonants. Such a phonetic junction belongs to Model 1.

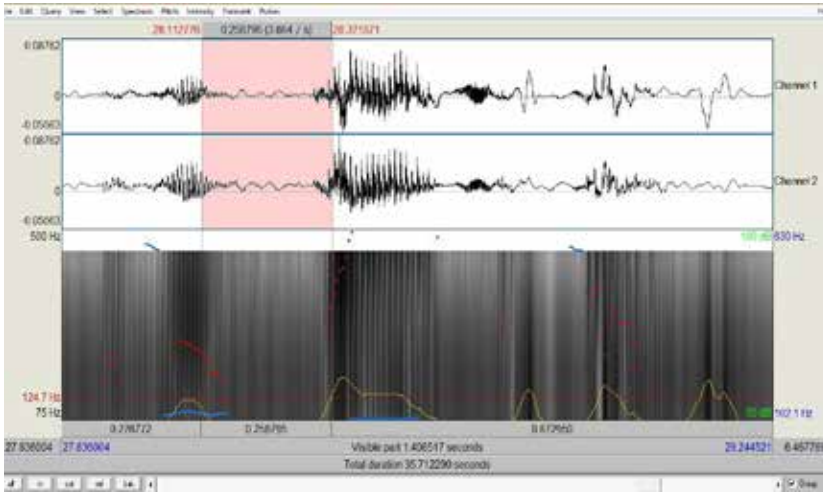
b) at the junction of two morphemes (see fig. 5.2)

The geminated consonants /д′–д′/ on the spectrogram (see fig. 5.2), '*ві**дд**ячити*' are characterized by descending and ascending articulatory tension. The first consonant is realized at the end of the morpheme and stands after the vowel, the second one is in the initial position. Each one has different articulatory and sound properties. The first consonant is characterized by the deletion of the third phase (recursion), and the second consonant is without the first phase (excursion), the second phase (delay time) in both consonants is retained and doubled, which is typical for Model 1.

c) in one morpheme at the junction of two syllables, after the stressed vowel (see fig. 5.3 and fig. 5.4)

The given example (see fig. 5.3) represents sonorous geminated consonants /н–н/ which are in the suffixal morpheme *не/з/дол/а́/нн/ий*. The stressed suffix /а́/ forms a syllable with a final root consonant, which attaches to itself the first geminated consonant, because the stressed syllable is final-strong, and the second one begins the another syllable that indicates the ambisyllabicity of the geminates.

The sonorous geminated consonants /н-н/ are characterized on the spectrogram (see fig. 5.3) *'нездола**нн**им'* by descending and ascending articulatory tension. The first consonant is characterized by the deletion of the third phase (recursion), and the second consonant is without the first phase (excursion), the second phase (delay time) in both consonants is retained and doubled. This observation gives the opportunity to qualify the geminated consonants /н-н/ as bi-phonemes that are realized in Model 1.



Intensity of articulation

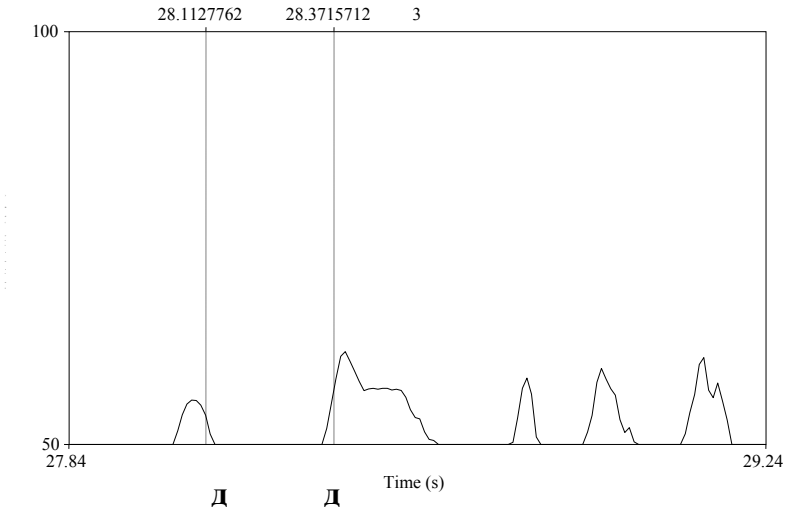
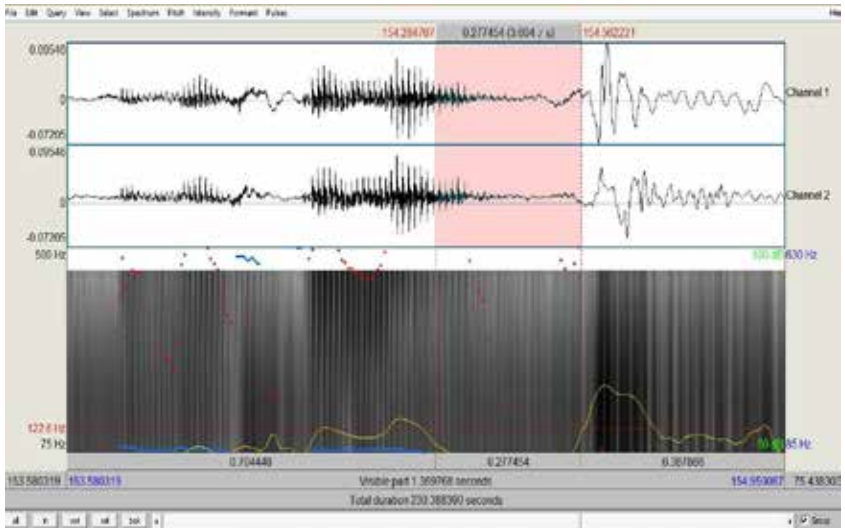
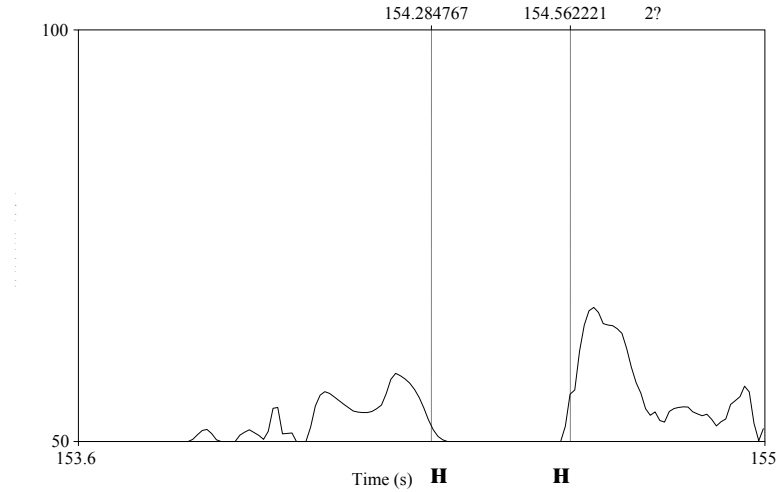


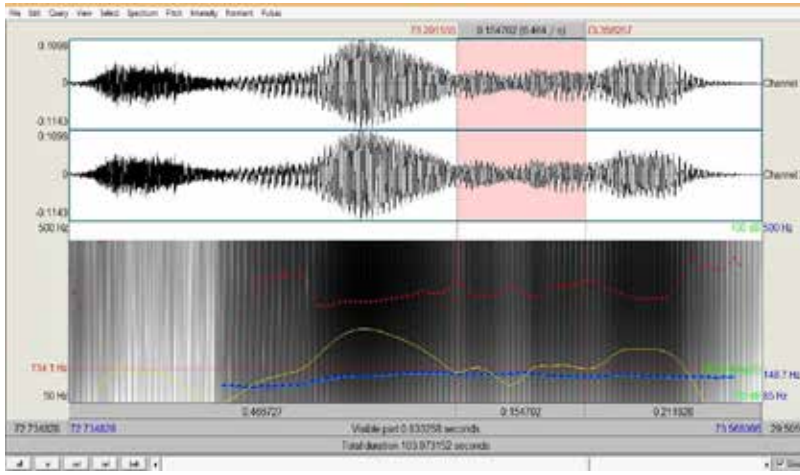
Fig. 5.2. Spectrogram of the word Ukr. ‘віддячити’



Intensity of articulation



Pic. 5.3. Spectrogram of the word Ukr. ‘нездоланним’



Intensity of articulation

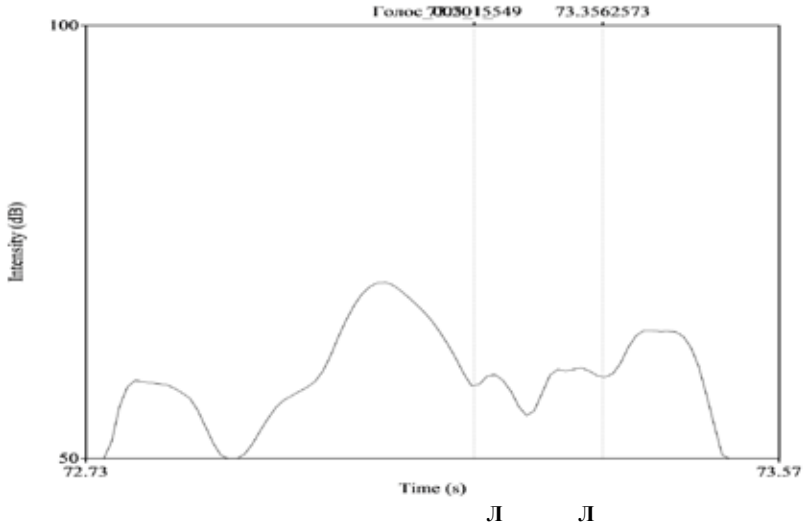


Fig. 5.4. Spectrogram of the word Ukr. ‘цві<u>лл</u>ю’

In the given example (see fig. 5.4), the geminated consonants are in the root morpheme, for example: *цвілл/ю*. The first consonant adjoins the stressed syllable, and the second one begins a new syllable, for example: *цві́л-лю*. Between geminated consonants passes the syllable boundary indicating the realization of two phonemes. It has been observed an ambisyllabic consonant, which refers simultaneously to two syllables and improves the syllable formation.

On the spectrogram (see fig. 5.4) *цвілл/ю*, the geminates are characterized by descending and ascending articulatory tension. The first consonant is without the third phase (recursion), and the second consonant is without the first phase (excursion), the second phase (delay time) in both consonants is retained and doubled that indicates the realization of two phonemes (Model 1).

Consequently, in one morpheme, the geminated consonants after the stressed vowel are divided into two syllables. The first consonant joins the stressed consonant, and the second one forms a new syllable while indicating that the function of the second geminated consonant is characterized by such a function as syllable formation and improvement of the syllable boundary. Such geminated consonants are identified as ambisyllabic, for example: *Ukr*. *під-бо-рі́д-дя.*

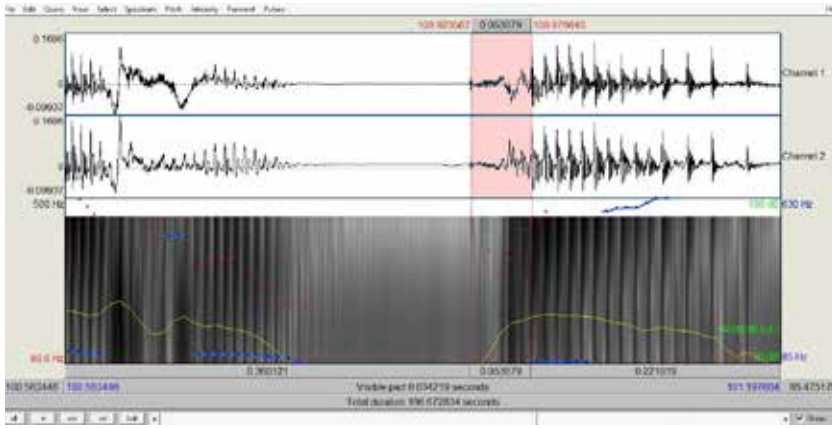
Ambisyllabic consonants are consonants, which refer to two syllables with an excursion, which belongs to the previous syllable, and recursion belonging to the next one [37, p.42].

Geminates as mono-phonemes are found in the Ukrainian:

a) in one morpheme before the stressed vowel (see fig. 5.5, fig. 5.6)

In the example (see fig. 5.5), disruptive consonants /т′–т′/ are in the suffixal morpheme *жи/тт/я′*, which joins the flexion and forms the stressed syllable that starts with a long consonant /т:′/. The first consonant adjoins phonetically to the second consonant, forming one phonetic unit. Long consonant /т:′/ represents a long phoneme, which forms a new word, for example: *жи/ти, жить – жи/тт/я*. The duplication of the consonants has occurred historically after the disappearance of the weak reduced sound before J, for example: *жыть*ѥ *– житје – життя*. The morphemic boundary between geminated consonants is absent, which also confirms their monophonematicity.

On the spectrogram (see fig. 5.5) *жи/тт/я´*, the geminated consonants have three phases of pronunciation: excursion, delay time, and recursion,



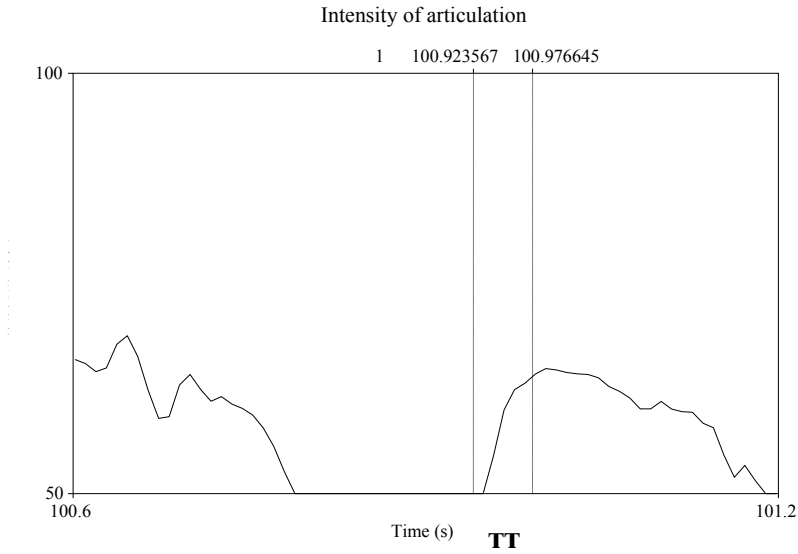
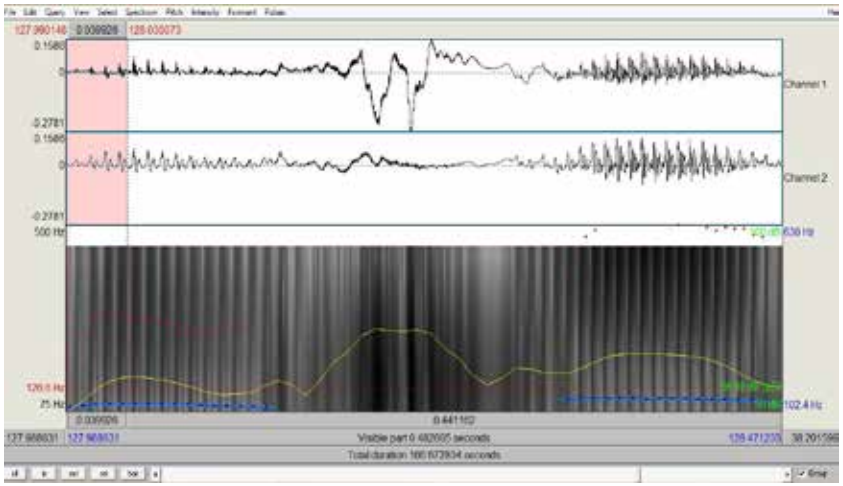


Fig. 5.5. Spectrogram of the word Ukr. ‘життя’

which allows to identify them as elongated consonants or real geminates, which represent one long phoneme. They have their own dynamics – a homogenous sound, the articulatory tension is characterized by an ascending direction, as it is shown on the spectrogram. The difference in



Intensity of articulation

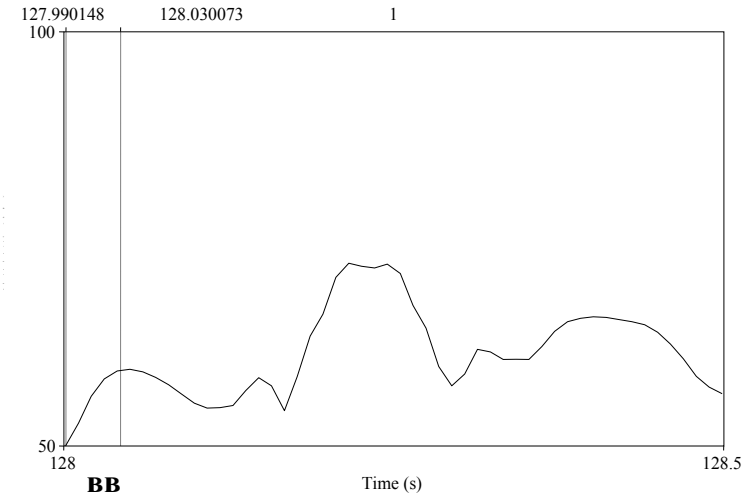


Fig. 5.6. Spectrogram of the word Ukr. ‘ввійшло’

the intensity of pronunciation han not been observed. It confirms the realization of Model 2.

The example (see fig. 5.6) represents doubled fricative consonants /в–в/ in the prefixal morpheme *вві/йшло*, where the first consonant adjoins phonetically to the next consonant forming a single phonetic unit, a long sound. The phonetic cohesion of sounds indicates the realization of one long phoneme.

The geminated consonants in the word '***вв****ійшло'* on the spectrogram (see fig. 5.6) are characterized by ascending articulatory tension starting with the entire word structure. There are three phases of pronunciation of geminated consonants: excursion, delay time and recursion, which allow to identify them as elongated consonants or real geminates, which represent one long phoneme that is realized in Model 2.

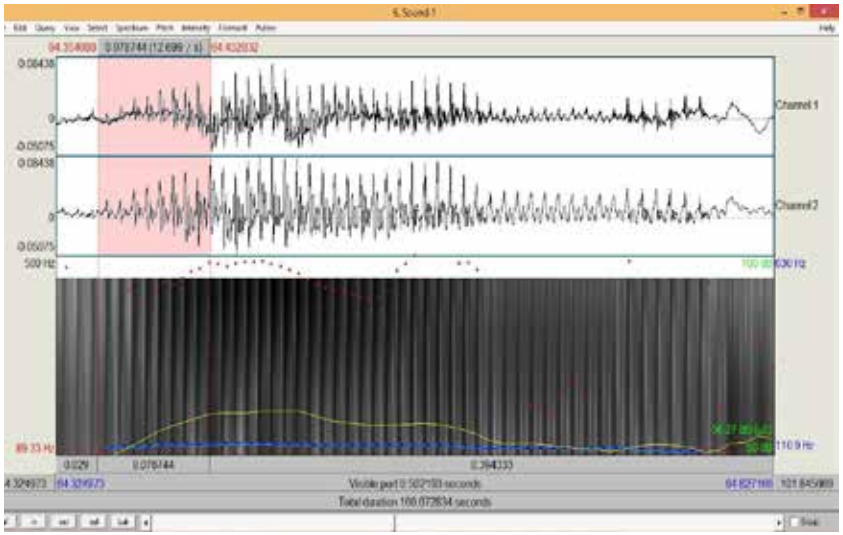
It can also be argued, based upon the experiment, that such geminated consonants can be identified as **tautosyllabic**. The tautosyllabic consonant is a consonant, which is a part of the same syllable, is characterized by recursion, delay time and excursion [37, p. 467].

b) at the junction of morphemes (root-prefixal upon condition that the prefixal morpheme consists of one sound) see. fig. 5.7, fig. 5.8:

The realization of geminated consonants /в–в/ at the joint of 'prefixal morpheme+root morpheme' consists of one long consonant sound (see fig. 5.6, fig. 5.7). Such conjunction of consonants has occured with the degradation of weak reduced consonant, for example: *вьвечери - ввечері, вьважав – в/важав*.

The first morpheme /в/ adjoins to the next morpheme *в/волене, в/важав* and forms the single phonetic unit that begins the word structure.

On the spectrogram (see fig. 5.7, fig. 5.8) *'**вв**олене', '**вв**ажав',* the geminated consonants are characterized by ascending articulatory tension before the stressed vowel, which corresponds to Model 2. The difference in intensity of pronunciation has not been observed. The geminated consonants /в–в/ have three phases of pronunciation: excursion, delay time and recursion, that allows to identify them as elongated consonants or real geminates, which represent one long phoneme. These geminated consonants have their own dynamics, which distinguishes them from see fig. 5.2. The prefixal-root joint disappears before the stressed root vowel, if the prefix consists of one consonant sound. The joint 'prefixal morpheme + root morpheme' of consonants [в–в] is represented through a long phoneme /в/, articulation energy of



Intensity of articulation

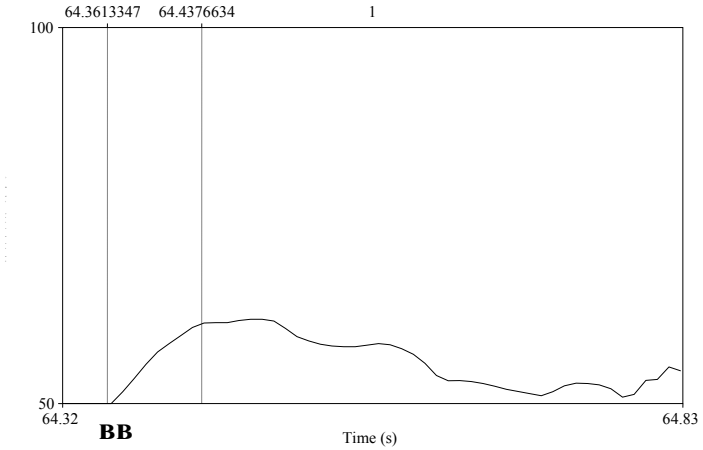
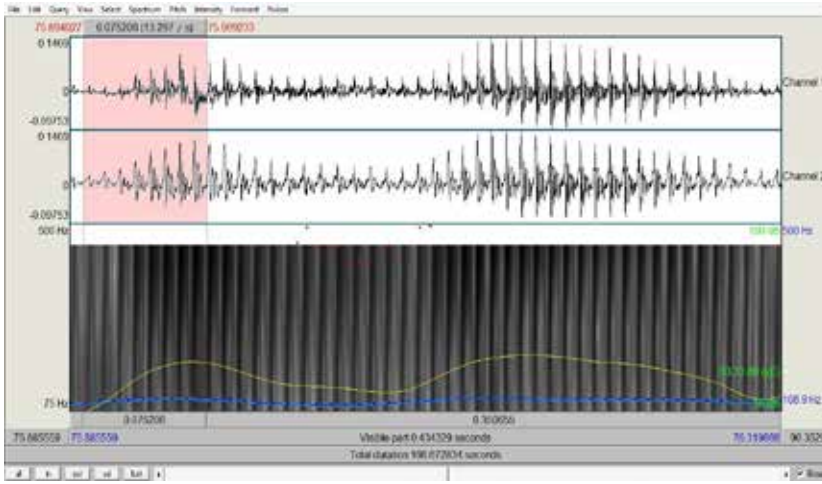
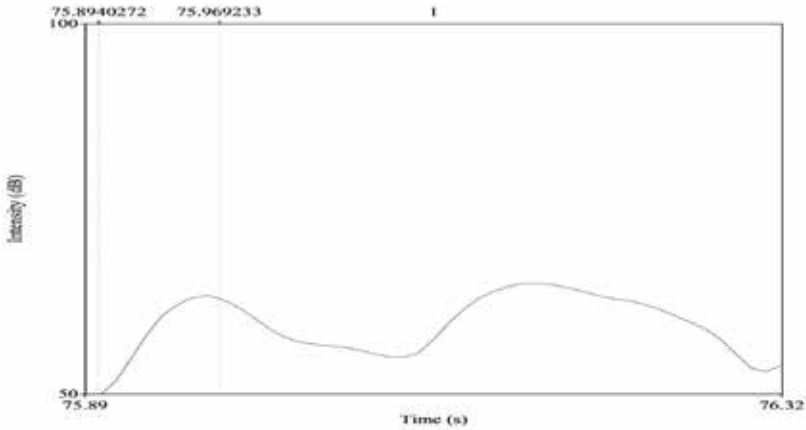


Fig. 5.7. Spectrogram of the word Ukr. ‘вволене’



Intensity of articulation



ВВ

Fig. 5.8. Spectrogram of the word Ukr. ‘вважав’

which corresponds to the first consonants. This regularity is characteristic for slavic languages [8, p. 43], which leads to the appearance of new phonemes, namely, long consonant phonemes in the Ukrainian.

Thus, in the Ukrainian due to the executed analysis [19], it has been observed following:

• twelve unreal geminates that are found at the junction of morphemes /б–б/ *о**бб**ивати*, /д–д/ *ві**дд**авати*, /д′–д′/ *ві**дд**ячити*, /т–т/ *о**тт**оді*, /з–з/ *ро**зз**иратися*, /з′–з′/ *ро**зз**ява*, /с′–с′/ *зрі**сс**я*, /в–в/ *спі**вв**ітчизник*, /н–н/ *безіме**нн**ий*, /н′–н′/ *моното**нн**ість*, /р–р/ *конт**рр**озвідник*, /ч–ч/ *до**чч**ин*, and eighteen unreal geminates at the word boundary /б-б/ *що**б б**ув*, /п-п/ *окрі**п п**люскотить*, /д-д/ *холо**д д**овго*, /т-т/ *момент творіння*, /т’-т’/ *промени**ть т**ільки*, /к-к/ *зви**к к**олисати,* /г-г/ *кру**г г**ойдався*, /ж-ж/ *а**ж ж**арко*, /з-з/ *уни**з з**вивистою*, /с-с/ *ча**с с**лухав*, /с’- с’/ *хто**сь с**істи*, /х-х/ *трьо**х х**вилин*, /й-й/ *зобов’язани**й й**ому*, /в-в/ *пройшо**в в**еликий*, /м-м/ *дівчата**м м**орозиво*, /н-н/ *гомі**н н**а*, /р-р/ *тепе**р р**озказати*, /ч-ч/ *пору**ч ч**ервона,* represent bi-phonemes.

• nine real geminates that are part of the stressed syllable /с:/ ***сс**авці*, /в:/ ***вв**ажати*, /з:/ ***зз**иратися*, /д′:/ *су**дд**я*, /т′:/ *жи**тт**я*, /л′:/ ***лл**яний*, /л:/ *го**лл**андець*, /н′:/ *зна**нн**я*, /в’:/ ***вв**ійти* and that according to the executed research can be identified as mono-phonemes.

• twelve ambisyllabic consonant /д′–д′/ *знаря**дд**я*, /т′–т′/ *завзя**тт**я*, /ж’–ж’/ *бездорі**жж**я*, /з′–з′/ *галу**зз**я*, /ш’–ш’/ *підда**шш**я*, /с′–с′/ *воло**сс**я*, /ц′–ц′/ *мі**цц**ю*, /н–н/ *Га**нн**а*, /н′–н′/ *вмі**нн**я*, /ч’–ч’/ *узбі**чч**я*, /л–л/ *породі**лл**ею*, /л′–л′/ *безді**лл**я* which occur after the unstressed vowel, are separated by the syllable boundary, execute the function of division into syllables, represent bi-phonemes.

6. Fonematic status of geminates and ambisyllabic consonants in German

The geminated consonants in German have been also considered in Model 1 and Model 2 according to the same principles:

1) The position of the geminates in relation to the stress:

a) after stress and b) before stress.

2) Articulatory tension. Two models of articulatory tension hav been identified:

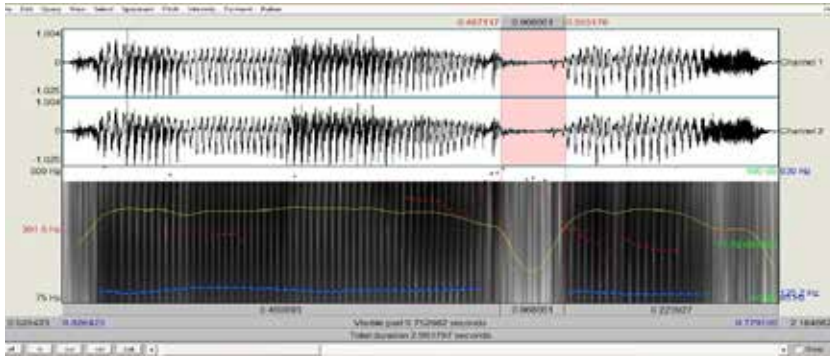
Model 1 is characterized by a descending and ascending direction of articulatory tension, the geminate stands after the stressed vowel at the junction of two words, morphemes and syllables.

Model 2 is characterized by the ascending direction of articulatory tension, the geminate stands before the stressed vowel.

Geminated consonants as bi-phonemes are found in German:

a) at the junction of two words within one syntagm (see fig. 6.1):

In the given example (see fig. 6.1), the first geminated consonant /l/ stands at the end of the word, and the second /l/ occupies an initial position. The structure is characterized by the fact that the first consonant is in final position of morpheme and word, and the second one is in the



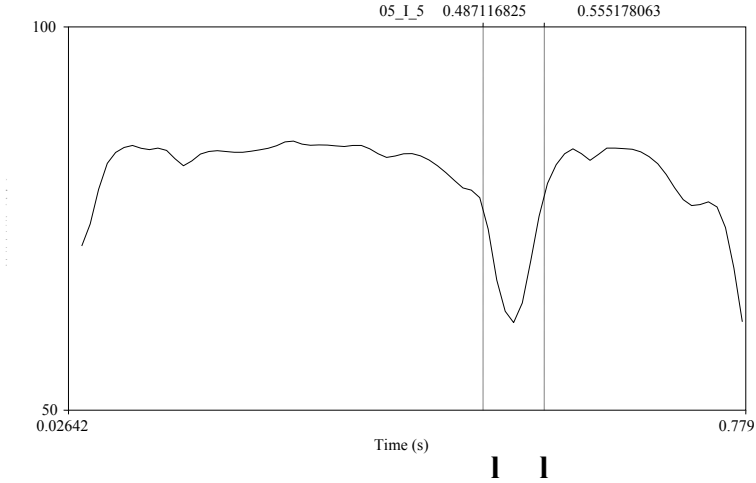


Fig. 6.1. Spectrogram of the word Germ. 'Einmal ließ'

postposition and belongs to the next morpheme of the next autonomous word. If two words are considered as a single phonetic word, then the morpheme boundary will pass between the geminated consonants, for example: /Einma**l**/**l**ieß/, indicating about two phonemes according to the morphological criterion.

It has been observed a transition from the stressed vowel to consonant and from consonant to vowel on the spectrogram, (see fig. 6.1). Each consonant /l-l/ has its delay time. The first consonant is characterized by the deprivation of the third phase (recursion), and the second consonant is without the first phase (excursion). The second phase (delay time) in both consonants is retained and doubled. The articulatory tension falls on the first consonant, and it is observed the rising tension on the second consonant. Each geminated consonant has its articulation dynamics. The geminated consonants belong to different morphemes (and words) that has been confirmed by Model 1.

b) at the junction of two morphemes (see fig. 6.2):

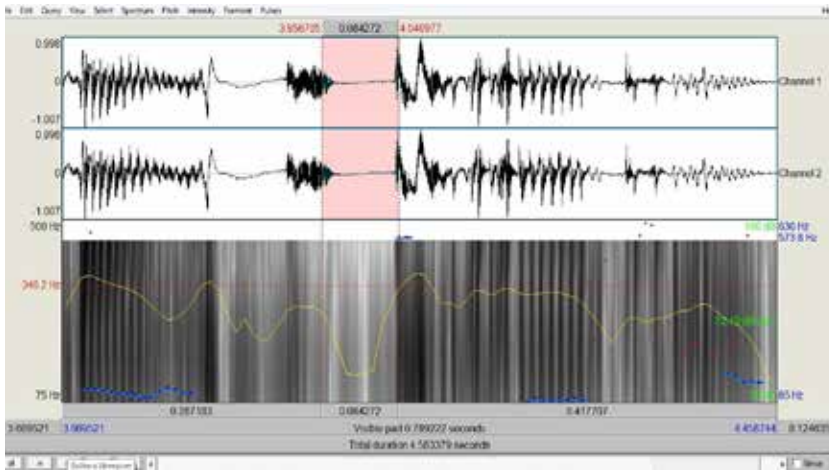
This example represents the gemination of consonants /t-t/ at the junction of morphemes indicating the belonging of each phoneme to different morphemes. There is a morphemic boundary between morphemes, which confirms the realization of two phonemes: *fort/tragen, auf/fordern*.

On the spectrogram (see fig. 6.2) '*for**tt**ragen'*, there is a transition from one consonant to the next one. The first consonant is without recursion, and the second one is without excursion, the delay time in both consonants is retained. There is a difference between the consonants, where the amplitude of the frequency components of the vowel spectrum of the sharply changes. Articulation is characterized by descending and ascending tension, which indicates the realization of two phonemes (Model 1).

c) in one morpheme at the junction of two syllables, after the stressed vowel (see fig. 6.3):

An example (see fig. 6.3) represents the geminated consonants of phoneme /p-p/ in the root morpheme with a syllable boundary between them: the first one closes the first syllable, and the second one adjoins to the vowel while opening the unstressed syllable that indicates about their biphonematicity, for example: *Sup-pe, Mut-ter, Tref-fen*. There is a syllable boundary between geminated consonants, which indicates about the realization of two phonemes.

In the spectrogram (see fig. 6.3) 'Su**pp**e', the articulation of the geminated consonants /p-p/ is characterized by a descending and ascending



Intensity of articulation

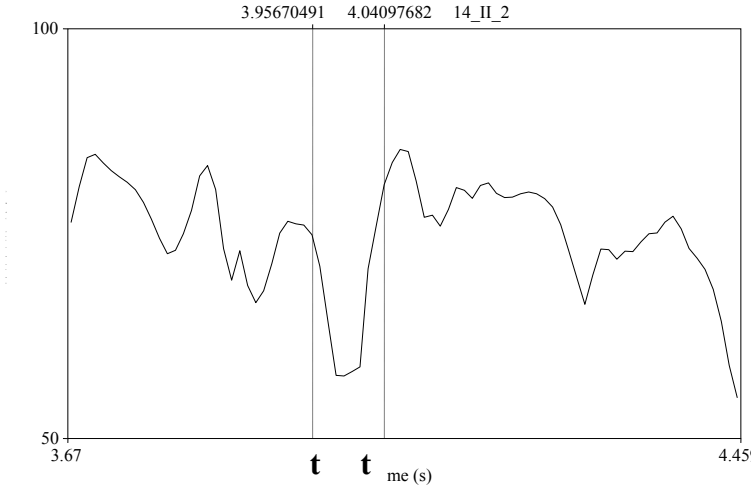
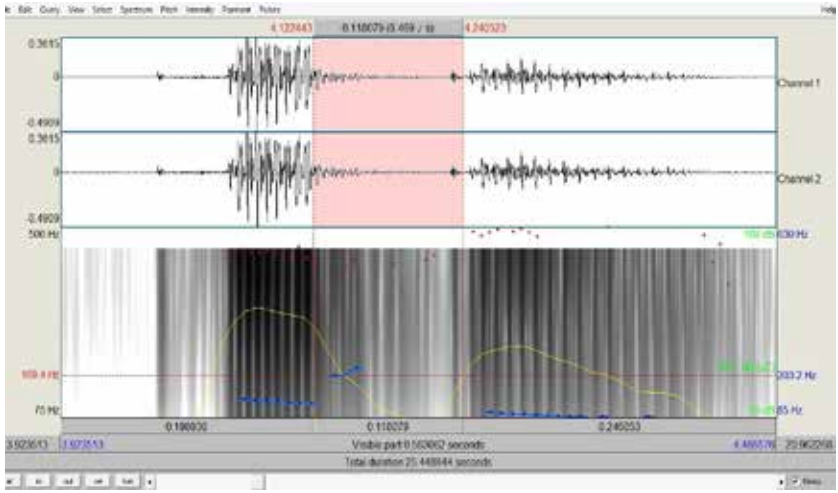


Fig. 6.2. Spectrogram of the word Germ. 'fortt<u>t</u>ragen'

articulatory tension. The first consonant is without the third phase (recursion), and the second consonant is without the first phase (excursion). The second phase (delay time) in both consonants is retained and doubled. The



Intensity of articulation

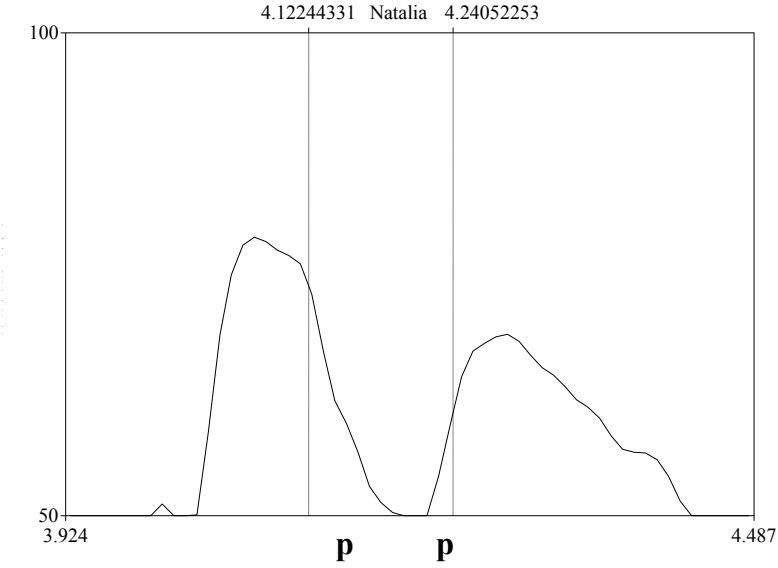


Fig. 6.3. Spectrogram of the word Germ. 'Suppe'

geminated consonants represent two phonemes (bi-phonemes) (Model 1). It has been observed an ambisyllabic consonant, which belogs simultaneously to two syllables. At the phonemic level, they represent a biphonemic connection, which performs a function of division into syllables, for example: *Li**p-p**e, Fu**t-t**er*. From the phonetic point of view, the biphonemic connection is a long (doubled) sound that points to the previous short vowel.

Therefore, in German, the duplicated consonants in one morpheme are ambisyllabic consonants, which represent 12 bi-phonemes, they mark the syllables and it explains the doubled writing of consonants. The pronunciation of such ambisyllabic consonants in one morpheme is characterized by prolonged sound with a difference in intensity (see fig. 6.3) and an implosion position. Ambisyllabicity indicates the previous short vowel.

Thereby, it has been observed in German due to the made analysis [19] the following:

• five unreal geminates are found at the junction of morphemes / t-t / *for**tt**ragen*, / f-f / *au**ff**allen*, / n-n / *a**nn**ehmen*, / m-m / *u**mm**achen*, / ll / *Spi**ll**ing* and eleven unreal geminates at the junction of words /p-p/ *knap**p** **p**endeln*, /t-t/ *sei**t** **T**agen*, /k-k/ *mit Kriti**k** **k**annst*, /f-f/ *au**f** **F**rauen*, /z-z/ *Plat**z** **z**u*, /l-l/ *Einma**l** **l**ieß,* /n-n/ *Minute**n** **n**ach*, /m-m/ *ih**m** **m**it*, /r-r/ *de**r** **r**ote*, /v-v/ *demonstrati**v** **v**or*, /ʃ- ʃ/ *physikali**sch** **sch**licht*, that represent the bi-phonemes.

• twelve ambisyllabic consonants /b–b/ *bi**bb**ern*, /p–p/ *Su**pp**e*, /t–t/ *zi**tt**ern*, /k–k/ *a**kk**urat*, /g–g/ *A**gg**ression*, /f–f/ *tre**ff**en*, /s–s/ *Bi**ss**en*, /l–l/ *Wi**ll**e*, /n–n/ Ha**nn**a, /m–m/ *fli**mm**ern*, /r–r/ *i**rr**e*, /z–z/ *Ski**zz**e,* which occur after the stressed vowel and are divided through syllable boundary, execute the function of division into syllables and represent bi-phonemes.

7. Conclusions

The experimental and phonetic method with application of acoustic analysis and descriptive and analytical method based on visual observations of spectrograms using the computer program PRAAT 5.0.43. has confirmed the hypothesis that the monophonematicity and biphonematicity of the geminated consonants depends on the stress:

• unreal geminates are realized at the junction of two words and at the junction of morphemes as bi-phonemes;

• ambisyllabic consonants are realized as bi-phonemes after the stressed vowel in one morpheme, at the junction of the syllables;

• real geminates are realized as mono-phonemes before the stressed vowel and at the junction of the prefixal-root morpheme, if the prefixal morpheme is monoconsonantal, and they begin the stressed syllable;

The phonemic status of the geminated consonants has been determined by the morphological criterion. If the morphemic boundary is absent in the middle of the sound combination, then the conclusion about its monophonematicity is unambiguous. If the morphemic boundary is between components of long sound, but in the presence of doubts in its biphonematicity, the following phonetic criteria have been used: 1) division into syllables, 2) division of intensity, frequency of the main tone and articulatory tension.

The acoustic analysis of the realization of geminated consonants has shown that in modern Ukrainian and German there are:

• doubled 'unreal' geminates that are characterized by descending and ascending articulatory tension – a) at the junction of words, for example: Ukr. під дубком, Germ. *wills**t t**anzen;* b) at the junction of morphemes, for example: Ukr. *о**бб**ити, ві**дд**ати, моното**нн**ість,* Germ. forttragen, au**ff**allen, *Spi**ll**ing* – there are two phonemes on the phonemic level, that is, biphonemic composition;

• ambisyllabic consonants that are characterized by descending and ascending articulatory tension are found at the junction of syllables in one morpheme after the stressed vowel, for example: Ukr. *воло**сс**я, підбері**дд**я*, Germ. *Tre**pp**en, Lö**ff**el* – at the phonemic level, such doubled consonants represent two phonemes. The phoneme executes the function of devision of meaningful units of language, in our case of syllables, for example: *весі**л**-**л**я*, *Fu**t**-**t**er*.

In German as well as in the Ukrainian, there is a very strong tendency of morphemic constancy. 'Morphemic writing makes reading easier. The speaker in the German can pronounce the ambisyllabic consonant as one and as two consonants. [10, p. 91-94]. 'In the New German language, ambisyllabic consonant plays an important role in achieving of the segmental minimum needed for division the syllable boundary in the stressed syllable, for example *[vaşa] vs. [va:zə] – /Wa**ss**er – Vase/* [18, p. 49]'.

In the Ukrainian, unlike the German, there are:

• elongated 'real' geminates (tautosyllabic consonants) that are characterized by ascending articulatory tension and are in one morpheme, stand before the stressed vowel, for example: *жи/**тт**я΄, взу/**тт**я΄, **вв**і΄ч/ливість, **лл**/є΄ться, **вв**і΄йти* – on the phonemic level they represent a long phoneme,

mono-phoneme. Also geminated consonants belong to the mono-phonemes at the junction of 'prefixal morpheme + root morpheme', for example: ***вв**ажати, **зз**иратися*. The geminated consonants stand before the stressed vowel, the morphemic boundary is observed, but the syllable boundary between the geminated consonants is absent, the articulatory tension is ascending, the intensity has three phases of pronunciation: excursion, delay time and recursion, which testifies the presence of the mono-phoneme.

According to the results of the research, the phonemic status of geminated consonants has been determined in the modern Ukrainian in comparison with the German. There is a realization of a mono- and bi-phonemes in modern Ukrainian at the place of geminated consonants in the following positions:

1. Bi-phonemes are used at the junction of two words, morphemes and two syllables.

2. Mono-phonemes function in one morpheme, in one syllable before the stressed vowel.

Modern German is characterized in contrast to Ukrainian by the presence of a bi-phonemes an the place of junction of the same consonants.

The researched languages have the same function that performs the binophonemic composiotion both in the Ukrainian and in German. Moreover, it is a function of division into morphemes and syllables.

Linguistic comparative analysis on the material of the two languages confirms that the geminated consonant monophonemes have a clear phonetic difference in modern Ukrainian, which is fixed in the language by the implementation of a distinctive function, for example: *у су**д**і – у су**дд**і, лють – **лл**ють*, which in general confirms the presence in the language of the phonemic opposition of long and short consonant phonemes. The presence of phonetic difference in the modern German and the absence of functional load give opportunity to declare that the geminated consonants appear in the speech (and, accordingly, in the language) in the form of ordinary duplication, which are not opposed to separate sounds, that is, they do not have a phonemic opposition 'long / short'.

This research of the special features of the pronunciation and perception of Ukrainian and German geminates and ambisyllabic consonants helps students who study Ukrainian or German as a foreign language to eliminate articulation errors and correctly perceive the meaning of the word.

This method for determining the phonemic status of the geminates and ambisyllabic consonants can be applied in all languages.

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